What is claimed is:

1. An aluminum nitride sintered body produced by sintering under pressure of a powder composition comprising aluminum nitride and 5 to 30 % by weight of at least one sintering aid selected from the group consisting of Nd, Sm, Eu, Er, Dy, Gd, Pr and Yb, per 100 % by weight of the powders of aluminum nitride and the sintering aid, wherein the amount of the sintering aid is a conversion value as oxides of the elements, the sintering body that has been subjected to mirror-polishing having a surface roughness R max of 0.2 μm or less and a thermal conductivity of 200 (W/mK) or more.

2. The aluminum nitride sintered body as defined in claim 1, wherein an amount of the sintering aid remaining in the sintered body is 0.05 to 5 % by weight, based on the sintered body.

3. The aluminum nitride sintered body as defined in claim 1, wherein the sintering temperature is 1800 to 200 ℃.

4. The aluminum nitride sintered body as defined in claim 1, wherein the sintering aid is at least one member selected from the group consisting of Nd, Sm, Eu and Gd.

5. The aluminum nitride sintered body as defined in claim 1, wherein an amount of Y and/or Ce in the powder composition is 10 % by weight or less as a conversion value of their oxides, based on the powder composition.

6. The aluminum nitride sintered body as defined in claim 1, wherein an amount of Y and Ce in the powder composition is substantially zero.

7. The aluminum nitride sintered body as defined in claim 1, wherein

the surface roughness R max is 0.15 μm or less.

8. A substrate for an electronic device comprising a sintered body having been subjected to mirror-polishing and a metallic film on the surface of the sintered body, the sintered body being aluminum nitride sintered body produced by sintering under pressure of a powder composition comprising aluminum nitride and 5 to 30 % by weight of at least one sintering aid selected from the group consisting of Nd, Sm, Eu, Er, Dy, Gd, Pr and Yb, per 100 % by weight of the powders of aluminum nitride and the sintering aid, wherein the amount of the sintering aid is a conversion value as oxides of the elements, the sintering body having a surface roughness R max of 0.2 μm or less and a thermal conductivity of 200 (W/mK) or more.

9. The substrate for an electronic device as defined in claim 8, wherein an amount of the sintering aid in the sintered body is 0.05 to 5 % by weight.

10. The substrate for an electronic device as defined in claim 8, wherein the sintering temperature is 1800 to 2000 ℃.

11. The substrate for an electronic device as defined in claim 8, wherein the sintering aid is at least one member selected from the group consisting of Nd, Sm, Eu and Gd.

12. The substrate for an electronic device as defined in claim 8, wherein an amount of Y and Ce in the powder composition is substantially zero.

13. The substrate for an electronic device as defined in claim 8, wherein the surface roughness R max is 0.15

14. A laser light generating device comprising a substrate having a metallic film thereon and a laser diode mounted on the metallic film, wherein the substrate comprising an aluminum nitride sintered body that has been subjected to mirror-polishing and the metallic film, the sintered body being produced by sintering under pressure of a powder composition comprising aluminum nitride and 5 to 30 % by weight of at least one sintering aid selected from the group consisting of Nd, Sm, Eu, Er, Dy, Gd, Pr and Yb, per 100 % by weight of the powders of aluminum nitride and the sintering aid, wherein the amount of the sintering aid is a conversion value as oxides of the elements, the sintering body having a surface roughness R max of 0.2 μm or less and a thermal conductivity of 200 (W/mK) or more.

15. The laser light generation device as defined in claim 14, wherein an amount of the sintering aid in the sintered body is 0.05 to 5 % by weight, based on the sintered body.

16. The laser light generation device as defined in claim 14, wherein the sintering temperature is 1800 to 200 ℃.

17. The laser light generation device as defined in claim 14, wherein the sintering aid is at least one member selected from the group consisting of Nd, Sm, Eu and Gd.

18. The laser light generation device as defined in claim 14, wherein an amount of Y and Ce in the powder composition is substantially zero.

19. A semiconductor device comprising a substrate having a metallic film thereon and a semiconductor element mounted on the metallic film, wherein the substrate comprising an aluminum nitride

sintered body that has been subjected to mirror-polishing and the metallic film, the sintered body being produced by sintering under pressure of a powder composition comprising aluminum nitride and 5 to 30 % by weight of at least one sintering aid selected from the group consisting of Nd, Sm, Eu, Er, Dy, Gd, Pr and Yb, per 100 % by weight of the powders of aluminum nitride and the sintering aid, wherein the amount of the sintering aid is a conversion value as oxides of the elements, the sintering body having a surface roughness R max of 0.2 μm or less and a thermal conductivity of 200 (W/mK) or more.

20. An aluminum nitride sintered body produced by sintering under pressure of a powder composition consisting essentially of aluminum nitride and 5 to 30 % by weight of at least one sintering aid selected from the group consisting of Nd, Sm, Eu and Gd, per 100 % by weight of the powders of aluminum nitride and the sintering aid, wherein the amount of the sintering aid is a conversion value as oxides of the elements, the sintering body that has been subjected to mirror-polishing having a surface roughness R max of 0.2 μm or less and a thermal conductivity of 200 (W/mK) or more.